## **CLAIMS**

## WHAT IS CLAIMED IS:

	1	1. In a system for presenting an audio stimulus having an input, an amplifier, an
	2	attenuator and a transducer, a method of predicting a sound pressure level emitted by the
	3	transducer comprising:
	4	applying a broadband audio signal to the input;
	5	inserting a first attenuation between the amplifier and the transducer;
	6	measuring a first output from the transducer;
	7	calculating a first transfer function for a signal path from the input to the measured first
Sim Lind 4ad 4al	8	output;
dinn thus	9	inserting a second attenuation between the amplifier and the transducer;
D D Jane	10	measuring a second output from the transducer;
dan dan	11	calculating a second transfer function for a signal path from the input to the measured
=	12	second output;
	13	combining the first and second transfer functions to solve for a characteristic impedance
	14	and sensitivity of the transducer;
	15	calculating a sound pressure level emitted by the transducer as a function of input signal
	16	and attenuation.

- 1 2. The method of claim 1 further comprising measuring the broadband audio signal
- 2 applied at the input simultaneously with measuring the first and second outputs from the
- 3 transducer.

- 1 3. The method of claim 2 wherein the first and second transfer functions are
- 2 calculated as respective ratios of the first and second measured outputs to the corresponding
- 3 measured inputs.
- 1 4. The method of claim 3 wherein each of the first and second transfer functions is
- 2 expressed as a product of an amplifier transfer function, an attenuator transfer function, an
- 3 electrical-to-acoustical transfer function and an acoustical-to-electrical transfer function.
- 5. The method of claim 4 wherein the characteristic impedance of the transducer iscalculated as:

$$Z_{L}(f) = \frac{H_{BD}(f, R_{I}, A, Z_{L}) \times R_{I} - H_{BD}(f, R_{2}, A, Z_{L}) \times R_{2}}{H_{BD}(f, R_{2}, A, Z_{L}) - H_{BD}(f, R_{I}, A, Z_{L})}.$$

6. The method of claim 5 wherein the sensitivity of the transducer is calculated as:

$$A(f) = \left| \frac{H_{BD}(f, R_I, A, Z_L) \times [Z_L(f) + R_I]}{H_{AMP}(f) H_{A2E}(f) \sqrt{Z_L(f)}} \right|.$$

7. The method of claim 6 wherein the sound pressure level is calculated as:

$$2 \qquad 20\log_{10}\left(\sqrt{\frac{\sum_{f}\left|Y_{X}(f)\bullet H_{D2E}(f)\bullet H_{BD}(f,R_{1},A,Z_{L})\bullet \frac{H_{ATTN}(f,R_{A},Z_{L})\right|^{2}}{H_{ATTN}(f,R_{1},Z_{L})}}\times \frac{1}{H_{A2E}(f)\bullet p_{0}}\right).$$

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$$2 \quad 10\log_{10}\left(\frac{\sum_{f}\left|Y_{X}(f)\bullet H_{D2E}(f)\bullet H_{BD}(f,R_{1},A,Z_{L})\bullet \frac{H_{ATTN}(f,R_{A},Z_{L})}{H_{ATTN}(f,R_{1},Z_{L})}\right|^{2}}{\sum_{f}\left|Y_{XREF}(f)\bullet H_{D2E}(f)\bullet H_{BD}(f,R_{1},A,Z_{L})\right|^{2}}\right)+N.$$

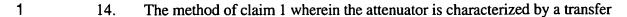
1 9. The method of claim 6 wherein the sound pressure level is calculated as:

$$2 \qquad 20\log_{10}\left(\sqrt{\frac{\sum_{f}\left|Y_{X}(f)\bullet H_{D2E}(f)\bullet H_{BD}(f,R_{1},A,Z_{L})\bullet \frac{H_{ATTN}(f,R_{A},Z_{L})}{H_{ATTN}(f,R_{1},Z_{L})}\bullet H_{A-W}(f)\right|^{2}}}\times \frac{1}{H_{A2E}(f)\bullet p_{0}}\right).$$

10. The method of claim 6 wherein the sound pressure level is calculated as:

$$2 \quad 10\log_{10}\left(\frac{\sum_{f}\left|Y_{X}(f)\bullet H_{D2E}(f)\bullet H_{BD}(f,R_{1},A,Z_{L})\bullet \frac{H_{ATTN}(f,R_{A},Z_{L})}{H_{ATTN}(f,R_{1},Z_{L})}\bullet H_{A-W}(f)\right|^{2}}{\sum_{f}\left|Y_{XREF}(f)\bullet H_{D2E}(f)\bullet H_{BD}(f,R_{1},A,Z_{L})\right|^{2}}\right)+N.$$

- 1 11. The method of claim 1 wherein the transducer is an acoustic transducer.
- 1 12. The method of claim 1 wherein the transducer is a vibratory transducer.
- 1 13. The method of claim 1 wherein the transducer is characterized by a transfer
- 2 function and further comprising inserting an inverse filter to equalize the transducer transfer
- 3 function.



- 2 function and further comprising inserting an inverse filter to equalize the attenuator transfer
- 3 function.
- 1 15. The method of claim 1 wherein the solution for the characteristic impedance of
- 2 the transducer is expressed as a function of frequency.
- 1 16. The method of claim 1 wherein the solution for the sensitivity of the transducer is
- 2 expressed as a function of frequency.

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